

DIETMAR SAUER, citizen of Germany, whose residence and post office addresses are Rehbühl 17, 78148 Gütenbach, Germany, has invented certain new and useful improvements in a

WIRELESS COMMUNICATION DEVICE WITH REPLENISHABLE  
CREDIT BALANCE

of which the following is a complete specification:

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# WIRELESS COMMUNICATION DEVICE WITH REPLENISHABLE CREDIT BALANCE

## CROSS-REFERENCES TO RELATED APPLICATIONS

**[0001]** This application claims the priority of German Patent Applications, Serial Nos. 200 04 892.9, filed March 17, 2000, and 200 20 522.6, filed December 1, 2000, the subject matter of which is incorporated herein by reference.

## BACKGROUND OF THE INVENTION

**[0002]** The invention relates to a wireless communication device intended for use without requiring a subscription with the service provider, and more particularly to a device having a replenishable credit balance that can be replenished offline or online using a banking affiliation of the user..

**[0003]** Wireless communication devices are typically set up to communicate with the ground stations operated by a service provider selected by the subscriber. The subscriber enters into a long-term contractual relationship with the service provider which may extend over a time period of a year or longer. Cancellation of the service agreement prior to the time period agreed to will result in substantial

monetary penalties. Some subscribers may want to use their wireless communication device only occasionally or for emergencies. They may be inclined to purchase a wireless communication device at a reasonable cost and may subsequently want to purchase a certain amount of calling time, for example in the form of a certain number of time units, for just such occasional use.

**[0004]** Wireless communication devices are usually equipped with a so-called SIM card that can be programmed and provides non-volatile memory. The SIM card contains user identification information, such as the telephone number of the wireless communication device, the serial number of the device, optionally a user code (PIN code), and an identification of the service provider. It may also contain additional information such as a personal call number directory.

**[0005]** The service provider bills for the calls, with the user receiving periodically a statement. Because charges are billed afterwards, there is a considerable risk for the service provider that services rendered will not be paid for.

**[0006]** Wireless communication devices are known that can be operated with cards, such as prepaid calling cards having a stored monetary value equivalent to a fixed number of call charge units. This card carries a code which is communicated by telephone to the service provider in question, which then clears the card. The number of units can be decremented during or after the call. When

the given number of call charge units has been used up, the card is no longer valid and can be disposed.

**[0007]** It would therefore be desirable to provide a device for storing information, for use in conjunction with a wireless communication device, which can be used for making calls immediately after it has been purchased but which still offers the network provider sufficient payment security.

#### SUMMARY OF THE INVENTION

**[0008]** According to one aspect of the invention, the wireless communication device includes means for storing a telephone number, means for storing a serial number of the wireless communication device, means for storing a monetary value available for call charges and means for storing a banking affiliation of the user. The means for storing the monetary value and the banking affiliation can be in the form of a chip card that can be replenished. The chip card can also include means for storing the identification of a service provider so that the money available for call charges can be used – immediately after purchase of the device – in the network of the service provider for whom the device was sold. When all the available money has been used up, the card can be recharged again by storing a new monetary value.

**[0009]** The card can be recharged, for example, by communicating with

banking affiliation of the user either online, i.e., using the wireless communication device, or offline, e.g., by connecting the wireless communication device or the card to another terminal that can communicate with banking affiliation of the user. In this way, the device or card can be recharged without the need for a cash transaction by simultaneously debiting the user's account with the sum of money desired for call charges. According to one embodiment, the wireless communication device may be used for online banking.

**[0010]** According to another feature of the present invention, the wireless communication device or card may include additional means for storing an electronic signature. In this way, the wireless communication device or card facilitates business transactions requiring a signature, insofar as electronic signatures are admissible. This embodiment provides additional security for the user identity which can then be verified by way of the user code (PIN-Code) and/or the electronic signature. The means for storing the bank affiliation of the user may be stored internally in the wireless communication device on a memory chip or on the separate card having a memory chip, such as a so-called chip card. Chip cards are known in the art.

**[0011]** An external read/write device may be provided to read the information stored on the memory chip or chip card and to store the balance after the call is completed and the charge for the call has been subtracted. The external read/write device may also be capable of reading the banking connection stored in

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**[0012]** According to another aspect of the invention, the wireless communication device may be connectable with a remote device for storing information, wherein this remote device has means for storing a cash balance available for call charges as well as means for storing a banking affiliation of a user and means for decrementing the cash balance to reflect the calling charges. The remote device may also include means for storing an electronic signature and a reading device for reading the stored electronic signature.

**[0013]** The wireless communication device of the invention allow the user to make or receive a call immediately after purchasing the communication device and have the banking affiliation stored in memory in the communication device or in a remote device, such as a chip card. Because the service provider's code and the billing information are stored on the device and/or card, the call is directed automatically through its network without the need to enter of billing information. The memory of the wireless card communication device or the chip card can be replenished – assuming a banking connection can be established – either directly or at a suitably equipped terminal. The chip card according to the invention thus

extends the advantages of the familiar telephone cards for use with land lines and a single provider to wireless communication devices, which can operate with different network providers. The respective service provider enjoys high payment security because payment is linked to the banking affiliation of the user, with the network provider's identification code ensuring payment.

**[0014]** The chip card may operate not only as a customary telephone card, but also as a cash card, bank card or credit card. The card may be used inside a wireless communication device or in appropriate accessory equipment which is connected with the wireless communication device via a wired or wireless link. The wireless communication device may also be integrated in another piece of equipment, for example a computer. A wireless communication device of this type may be useful for users who want to use their wireless communication device only occasionally or for emergencies and do not intend to receive incoming calls.

#### BRIEF DESCRIPTION OF THE DRAWING

**[0015]** Other features and advantages of the present invention will be more readily apparent upon reading the following description of a preferred exemplified embodiment of the invention with reference to the accompanying drawing, in which Fig. 1 is a schematic block diagram of a wireless communication system with a storage device according to the invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0016]** Turning now to FIG. 1, there is shown a schematic block diagram of a wireless communication system 10, such as a mobile phone or Internet appliance, for communication via a wireless link 14 with a radio tower 12 operated by a service provider. Before the communication device 10 can operate within the communication network of the service provider, a card 18 with stored information related to the service provider's identification, such as a PIN code for a service provider, a dial-in number, a code for dialing into the telephone network, free hotline numbers, GSM compatibility, a serial number and card type, as well as an available call-charge or credit balance is placed in communication with the communication device 10 via a communication link 16, such as a cradle. The different identification numbers may be stored in the same or in an additional memory chip (not shown) disposed on the card. A banking affiliation may also be stored on the card, either on the same memory chip(s) or on an additional memory chip. A card 18 of this type can, for example, be distributed by businesses which are independent of the service provider, for example at kiosks. The user inserts the card 18 in or connects the card 18 to his/her wireless communication device 10, and by virtue of the service provider identification stored on the card 18, every call will be directed through the network of this particular provider. After a call is ended, the balance remaining after subtraction of the call charge is stored. The service provider may allow calls to proceed only if the credit balance stored on the

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card exceeds a predetermined value. Since the user's banking connection is also stored on the card, the card can be replenished at suitable read/write terminals 22 which are connectable to a banking affiliation 26 via a communication link 24, for example, a dial-up phone line, or by other means, such as online banking. If desired, identification for a different service provider can be stored at the same time.

**[0017]** The card user's electronic signature, for example in form of a PIN number, can be stored additionally on one of the memory chips or on an additional memory chip, and can be read and transmitted for business transactions conducted via the wireless communication device 10, with the electronic signature providing additional security for the transaction.

**[0018]** While the invention has been disclosed in connection with the preferred embodiments shown and described in detail, various modifications and improvements thereon will become readily apparent to those skilled in the art. For example, the card can be incorporated in the wireless device itself, with the wireless device placed in a cradle for replenishing the stored credit amount. Accordingly, the spirit and scope of the present invention is to be limited only by the following claims.

**[0019]** What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims: